

Claims

1. Method of hot-shaping a steel part, wherein:
 - a billet of steel is obtained with the following composition;
 - $0.35\% \leq C \leq 2.5\%$
 - $0.10\% \leq Mn \leq 2.5\%$
 - $0.60\% \leq Si \leq 3.0\%$, with preferably $Mn\%/Si\% \geq 0.4$
 - $traces \leq Cr \leq 4.5\%$
 - $traces \leq Mo \leq 2.0\%$
 - $traces \leq Ni \leq 4.5\%$
 - $traces \leq V \leq 0.5\%$
 - $traces \leq Cu \leq 4\%$ with $Cu \leq Ni\% + 0.6 Si\%$ if $Cu \geq 0.5\%$
 - $traces \leq Al \leq 0.060\%$
 - $traces \leq Ca \leq 0.050\%$
 - $traces \leq B \leq 0.01\%$
 - $traces \leq S \leq 0.200\%$
 - $traces \leq Te \leq 0.020\%$
 - $traces \leq Se \leq 0.040\%$
 - $traces \leq Pb \leq 0.070\%$
 - $traces \leq Nb \leq 0.050\%$
 - $traces \leq Ti \leq 0.050\%$
 - optionally: $traces \leq P\% \leq 0.200\%$, $traces \leq Bi \leq 0.200\%$, $traces \leq Sn \leq 0.200\%$, $traces \leq As \leq 0.200\%$, $traces \leq Sb \leq 0.200\%$, with $P\% + Bi\% + Sn\% + As\% + Sb\% \leq 0.200\%$, the remainder being iron and impurities resulting from the manufacture.
 - a heat treatment is if need be applied to it, which gives it a globular primary structure;
 - it is heated to an intermediate temperature between its solidus temperature and its liquidus temperature under conditions such that the solid fraction has a globular structure;
 - thixoforging of the said billet is carried out so as to obtain the said part;
 - and cooling of the said part is carried out.

2. Method as claimed in Claim 1, wherein the said thixoforging takes place in a zone of temperatures where the liquid material fraction present in the billet is between 10 and 40%.
3. Method as claimed in Claim 1, wherein the said cooling is effected in still air.
4. Method as claimed in Claim 2, wherein the said cooling is effected in still air.
5. Method as claimed in Claim 3, wherein the said cooling is carried out at a speed lower than that which would obtain natural cooling in air.
6. Method as claimed in Claim 4, wherein the said cooling is carried out at a speed lower than that which would obtain natural cooling in air.
7. Steel part wherein it is obtained by a hot-shaping method as claimed in Claim 1.